



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,244	04/12/2004	Jing-Horng Gau	JCLA12737	4067
23900	7590	06/02/2005	EXAMINER	
J C PATENTS, INC. 4 VENTURE, SUITE 250 IRVINE, CA 92618			MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/823,244

Applicant(s)

GAU, JING-HORNG

Examiner

Johannes P. Mondt

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the filing of the Application on 4/12/04.

Priority

Although a foreign priority document appears in the Oath/Declaration as filed on 4/12/04 no foreign priority has been claimed to date by Applicant ("No" box ticked in said Oath/Declaration) while no foreign priority document has been received from Applicant. Therefore, no foreign priority exists for the Application to date.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. ***Claims 1-9*** are rejected under 35 U.S.C. 102(b) as being anticipated by Dikeman et al (5,932,898). Dikeman et al teach (Figure 3, title, abstract, col. 1, l. 7-16 and col. 6, l. 25 – col. 8, l. 9) a junction diode comprising: a first conductivity type (p-type) substrate 50 (col. 6, l. 31); a second conductive type (n-type) embedded region 52/58 (Table 1, col. 6, l. 29 and l. 38-39), formed within the first conductive substrate 50; a second conductive type (hence: n-type) well 54 (col. 6, l. 26-41), formed within the second conductive type embedded region, wherein the second conductive type well has a dopant concentration smaller than the second conductive type embedded region (N- as compared to N: see description in Table 1, col. 5, l. 60); a first conductive type (p-type) doped region 70, formed in the second conductive type well (col. 6, l. 60); and a second

Art Unit: 2826

conductive type (hence: n-type) doped region (either 68 (col. 6, l. 43) or 60 (col. 6, l. 39-40) (N.B.: since 54 is within 52 and 68 is within 54 it follows that 68 is within 52). With respect to the verb "formed" Applicant is reminded that for structure applications as opposed to process applications only the final structure carries patentable weight and hence "formed" and "located" are synonymous within the context of Applicant's application for a junction diode structure. In conclusion, Dikeman et al clearly anticipate claim 1.

On claim 2: the first conductive type substrate comprises a p-type substrate 50 (col. 6, l. 31);

On claim 3: the second conductive type embedded region comprises an N-type embedded region 52/58 (Table 1, col. 6, l. 29 and l. 38-39);

On claim 4: the second conductivity type well comprises an N-type well 54 (col. 6, l. 26-41);

On claim 5: the second conductivity type well comprises an epitaxial layer 54 (col. 6, l. 30);

On claim 6: the epitaxial layer 54 comprises an N-type epitaxial layer (loc.cit.);

On claim 7: the first conductivity type doped region 70 comprises a p-doped region (loc.cit.);

On claim 8: the second conductivity type doped region (either 60 or 68) comprises an N-doped region (loc.cit.).

On claim 9: the junction diode by Dikeman further comprises a plurality of isolation structures (vertical portion of P-well set between 60 and 68 and nhv (heavily n-

Art Unit: 2826

doped and hence providing insulation for 70 around 70 in the substrate) (see Table 1, col. 5, lines 54-55 and col. 6, l. 26- col. 7, l. 2) set between the first conductivity type doped region and the second conductivity type doped region (cf. Figure 3).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. ***Claims 10-17*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pequignot et al (6,891,207 B2) in view of Cottrell (4,626,882). *Pequignot et al* teach (Figures 2, 5, 6 and 14, title, abstract, col. 3, l. 31 – col. 10, l. 50) a first conductive type substrate 10 (p-type) (col. 3, l. 47-48 and col. 4, l. 34); a second conductivity type (n-type) deep well 3/8/8A/3A (col. 4, l. 24-27, and Figures 12, and 14) formed within said first conductivity type substrate; a first conductive type (p-type) well 6, 6A (col. 4, l. 20), formed within the second conductive type deep well; a plurality of first conductive type (p-type) doped regions 5, 5a (Figures 2 and 14) (col. 2, l. 35-40) formed in the first conductive type well (Figure 14); and a plurality of second conductive type doped regions 3, 3A, 3B (col. 4, l. 25-27) formed in the first conductive type well and the second conductive type deep well (said second conductive type doped regions 3, 3A, 3B abut both the first conductive type well 6/ 6A as well as the second conductive type deep well 3/8/8A /3A (cf. Figures 2 and 14) and hence are located therein. In this regard

Art Unit: 2826

Applicant is reminded that the patent is for a structure rather than a process and hence the distinction between "formed" and "located" has no patentable weight.

Pequignot et al do not necessarily teach the limitation that said first conductive well is to consist of the claimed first conductive well and first conductive shallow well formed therein and with a dopant concentration smaller than said first conductive well. However, it would have been obvious to include said limitation in view of *Cottrell et al*, who, in patent on over-voltage protection diode structures (see title and abstract) (hence analogous art), teach the use of a nested well for the well containing the plurality of doped regions that is graded in impurity concentration such that a well region 44 formed within a well region 42 has a lower impurity concentration than said well region 42 (see Figure 3 and col. 5, l. 58 – col. 5) for the specific purpose of creating a built-in electric field all around the second well region 44 to repulse charge carriers from moving into the abutting region of opposite conductivity type (col. 6, l. 7-14). This effect is of course only dependent upon the existence of a difference in conductive type between said abutting region and said first conductive well and is applicable under interchange of n- and p- type conductivities. Motivation to include the teaching by *Cottrell et al* in the invention by *Pequignot et al* derives from the added reduction of current in the substrate.

On claim 11: the first conductivity type substrate is p-type (col. 4, l. 34).

On claim 12: the second conductive deep well comprises an N-type deep well ((col. 4, l. 24-27, and Figures 12, and 14);

On claim 13: the first conductive type well comprises a p-type well ((col. 4, l. 20).

On claim 14: in the combined invention said first conductive type shallow well is p-type because it has the same conductivity type as the first conductive type well.

On claims 15-16: the first conductive type doped region comprise P-doped region and the second conductive type doped regions comprise n-type region (see above under claim 10).

On claim 17: the junction further comprises a plurality of isolation structures 4 (col. 3, l. 41 and Figures 2 and 14) with each isolation structure set between every pair of first conductive type doped region and second conductive type doped region (cf. Figures 5, 6 and 14).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Leonardi (6,121,640) and Pequignot et al (US 2005/0073006 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
May 29, 2005

Patent Examiner:

A handwritten signature in black ink, appearing to read 'Johannes Mondt', with a stylized flourish at the end.

Johannes Mondt (Art Unit: 2826).